

# **Wildlife Species Investigation of the Bound Brook Ecosystem, South Plainfield, New Jersey**

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**FINAL REPORT**



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## 1.0 INTRODUCTION

A wildlife species investigation was conducted on several reaches of Bound Brook in South Plainfield, New Jersey. On December 3, 2008, a Certified Wildlife Biologist from Stantec Consulting Services Inc. (Stantec) conducted a reconnaissance-level habitat assessment and wildlife species search to identify potential species occurrence in the Bound Brook Ecosystem. The survey investigated sites along Bound Brook from the Dismal Swamp through South Plainfield to New Market Pond (Figure 1).

## 2.0 STUDY AREA

Bound Brook is a moderately sized perennial stream; its headwaters are located in the Dismal Swamp, the largest contiguous wetland in Middlesex County. The Dismal Swamp is approximately 650 acres and stretches across the townships of Edison, Metuchen, and South Plainfield. The Dismal Swamp is an environmentally sensitive forested wetland, and the US Environmental Protection Agency (USEPA) has designated it to be a Federal Priority Wetland<sup>1</sup>. The Dismal Swamp provides natural flood control, is a major aquifer recharge zone, and influences a downstream fishery.

From the Dismal Swamp, Bound Brook traverses through South Plainfield to New Market Pond (Figure 1). At the western end of New Market Pond, Bound Brook continues west for approximately four miles before joining with the Green Brook. The Green Brook continues southwest for three miles before discharging into the lower Raritan River.

As Bound Brook flows away from Dismal Swamp, large forest fragments and wetland complexes give way to narrowly wooded corridors as it flows toward New Market Pond. Flowing through South Plainfield, the setting for Bound Brook is largely urban, and various industrial complexes and railroad operations abut the stream corridor. Native habitats adjacent to the brook consist of small woodlots and fields. Woods are dominated by hardwood species, including red maple (*Acer rubrum*), silver maple (*Acer saccharinum*), green ash (*Fraxinus pennsylvanica*), and various oak (*Quercus*) species. The fields are dominated by tall grasses and brambles (*Rosa* spp. and *Rubus* spp.).

Bound Brook has been contaminated by polychlorinated biphenyls (PCBs) and other hazardous materials associated with a Cornell Dubilier Electronics, Inc. facility operating from 1936 to 1962. The New Jersey Department of Environmental Protection has since issued a Fish Advisory and posted signs warning people not to eat fish taken from Bound Brook and its impoundment, New Market Pond.

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<sup>1</sup> The USEPA Priority Wetland list recognizes those areas considered to be the most important and vulnerable wetlands in a State. Priority wetlands are identified by various Federal, state and private contributors. The Priority Wetland list is not a comprehensive inventory, but rather a listing of areas currently known to the USEPA to be important and/or under particular threat. Reference: US Environmental Protection Agency. 1994. Priority Wetlands for the State of New Jersey. US Environmental Protection Agency, Region 2, Marine and Wetlands Protection Branch. March.

### **3.0 METHODS**

On December 3, 2008, a Stantec wildlife biologist surveyed five stream reaches along Bound Brook to investigate wildlife species presence. The five survey areas are indicated on Figure 1. Survey Area 1 was located in the Dismal Swamp. Survey Areas 2 and 3 are adjacent to the Hamilton Industrial Park (formerly known as the Cornell-Dubilier Electronics, Inc. property). Survey Area 4 is situated downstream of Bound Brook confluence with Cedar Brook. Survey Area 5 is located approximately one-half mile downstream of Area 4.

The reconnaissance-level survey targeted mammal species that could potentially be utilizing or inhabiting Bound Brook. With the help of two other observers, the wildlife biologist walked and/or waded the riparian zone to inspect each Survey Area. At each Survey Area, mudflats were carefully inspected for tracks. Observed tracks were photographed and measured. Logs and rocks were also inspected for scat. Any detected scat was collected and examined to determine its origin.

### **4.0 RESULTS**

On December 3, 2008, at the time of the survey, brook flows were moderate, and depths in the middle of the channel were 2 to 3 feet. Overall, wildlife tracking conditions along Bound Brook were excellent. Three days prior to the wildlife survey, a heavy rain occurred, and brook shores were still quite soft and experiencing daily track impressions. In the three days since the rain, the brook had receded enough to expose mudflats to adequately allow animal visitation. Most mudflats at all stations were heavily tracked by several mammal and bird species. One drawback of the Bound Brook system itself is that even minor rainfall events tend to result in flooding that would likely remove most scatological evidence. Hence, scat detections were extremely low during the wildlife survey.

Animal detections and potential animal occurrences are summarized in Appendix A.

#### **4.1 Survey Area 1**

Survey Area 1 is situated at the edge of the Dismal Swamp. This reach is relatively rural in character. The Triple C Ranch and Nature Center is located only a few meters from the east bank of the brook. Otherwise, the immediate habitat is dominated by forest, forested wetlands, and emergent wetlands. Dense residential areas occur to the west and south of the Dismal Swamp.

The banks of the brook at Survey Area 1 are shallowly sloped, and the natural floodplain remains intact. Hardwood trees dominate the canopy, and multiflora rose (*Rosa multiflora*) grows in thick patches in the understory. Mink tracks were found in several places on the shores of Bound Brook at Survey Area 1 (Photo 1). Other furbearers detected included striped skunk (*Mephitis mephitis*) (Photo 2) and raccoon (*Procyon lotor*). Beyond the immediate floodplain, small mammal burrows were found in the grassy field (Photo 3) associated with the Triple C Ranch. Other species detected

include white-tailed deer (*Odocoileus virginianus*) and wild turkey (*Meleagris gallopavo*). Upon arrival at Survey Area 1, several mallards (*Anas platyrhynchos*) were flushed from the brook immediately downstream.

Beaver (*Castor canadensis*) gnawings and woodcuts occur throughout this reach of Bound Brook. None of these signs appeared recent, and no lodges or dams were observed in the wetlands immediately adjacent to this reach of the brook. However, based on communications with Middlesex County maintenance workers, the workers periodically remove beaver dams in this reach of Bound Brook in order to prevent flooding on roads.

#### **4.2 Survey Areas 2 and 3**

Natural habitat at Survey Areas 2 and 3 is confined to the brook proper. Banks are generally well vegetated with trees and shrubs (Photo 4), but beyond the brook corridor, the setting is immediately dominated by industrial development (Figure 1). Much of the ground surface is paved with the exception of a landfill that borders the brook directly west of Survey Area 2.

Survey Areas 2 and 3 were surveyed by wading this entire reach of Bound Brook. The banks at these two areas are relatively tall (greater than 6 ft) with steep inclines (greater than 30 degrees). Tracking locales were frequent but quite small, generally less than a few square yards. However, the density of tracks was surprisingly high. Mammal tracks detected include gray squirrel (*Sciurus carolinensis*) (Photos 7), raccoon, striped skunk, mice, and white-tailed deer. Several songbird tracks were observed on the mudflats. Additionally, an adult red-tailed hawk (*Buteo jamaicensis*) was perched over the brook immediately upstream of Survey Area 2.

Tracks belonging to a large mustelid (*i.e.*, a member of the weasel family) were detected at Survey Area 2 (Photos 5 and 6). These tracks are suspected of belonging to a fisher (*Martes pennanti*). Several tracks were found but only two impressions could be utilized for identification. Unfortunately, the mudflat where these tracks were observed was too small for the animal to leave stride or gait evidence, which would have enhanced further verification. The New Jersey Division of Fish and Wildlife Furbearer Biologist reviewed the photographs of the mustelid tracks and indicated that the tracks most likely belonged to a fisher. Additionally, within a few yards of these tracks lay a scat pile that possessed characteristics belonging to that of a large mustelid (Photo 7). The presence of both the tracks and scat pile provide convincing evidence that an individual fisher visited this reach of Bound Brook.

#### **4.3 Survey Area 4**

Survey Area 4 is located downstream of the Bound Brook confluence with Cedar Brook (Figure 1). The setting is a relatively large and undeveloped open space (Photos 8 and 9). A railroad track dissects this tract of land; otherwise woods and fields dominate the immediate surroundings. At Survey Area 4, brook banks are short and steep, and mudflats occur infrequently.

Notable tracks include mouse, squirrel, and white-tailed deer. Of particular record, tracks from a muskrat (*Ondatra zibethicus*) were found on the edge of the brook (Photo 10). Muskrats would be attracted to this reach particularly with its open grassy habitat.

#### **4.4 Survey Area 5**

Survey Area 5 is well connected to the open space found at Survey Area 4 (Figure 1), but it is also bordered by industrial and residential development. The area is characterized by a hardwood overstory dominated by silver maple, and shallow banks covered with multiflora rose and other thick shrubby vegetation.

Exposed mudflats occurred infrequently at Survey Area 5, and few animal tracks were observed. Raccoon tracks were observed along the brook on one of the few exposed mudflats.

### **5.0 DISCUSSION**

The reaches of Bound Brook that were investigated during the wildlife survey had been frequented by several species of animals. Recorded animals that have a high dependence on aquatic habitats include mink, muskrat, and mallard. It is also important to note that Survey Areas 2 and 3, which are adjacent to the Hamilton Industrial Park, appeared to experience a relatively high level of animal visitation in the days before the wildlife survey. The heavy incidence of traffic may be due to animals venturing from the Dismal Swamp and possibly traveling between the Swamp and the more expanded habitat downstream at Survey Area 4.

The mink detected at Survey Area 1 is probably part of a viable population centered in the wetland complex situated in the Dismal Swamp. Optimal habitat for mink includes a setting possessing a variety of wetland habitats, woods with hollow trees or down logs, and dependable food sources, particularly fish. This reach of Bound Brook and the Dismal Swamp contain all of these elements.

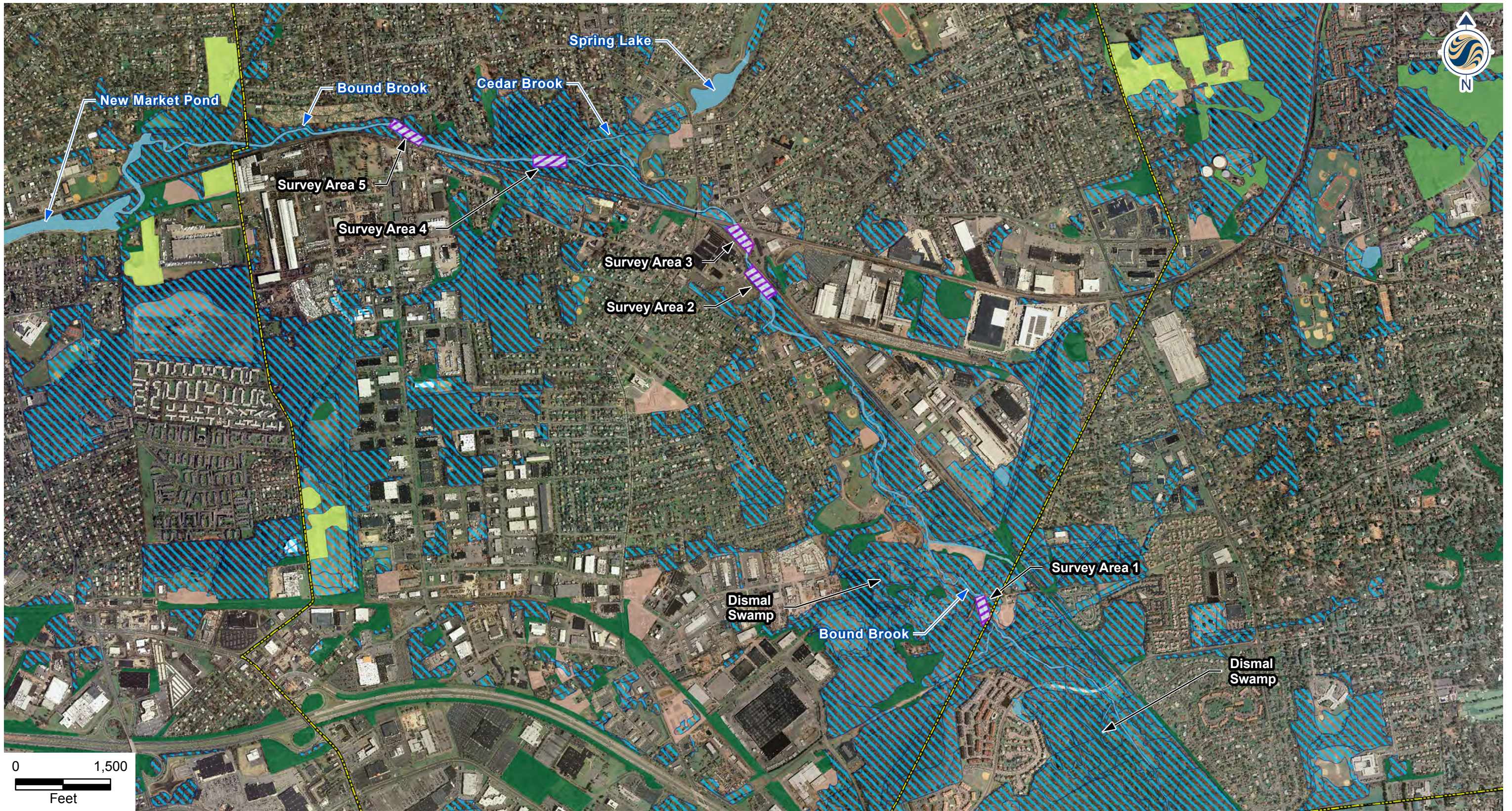
Conversely, the probable fisher that visited Survey Area 2 is likely to be a transient individual. Reports of fisher signs and sightings in New Jersey do occur, but they are still considered rare statewide. The origin of recently observed fishers in New Jersey may be linked to an established population in southeastern New York (pers. comm., A. Burnett, State Furbearer Biologist, NJ Division of Fish and Wildlife). Fishers reintroduced in the Catskills in the late 1970s eventually resulted in an established population by the mid-1980s.

Although fishers are documented in all kinds of habitats, the study area is not in a part of New Jersey likely to support a breeding population. The density of development in South Plainfield and the vicinity do not provide adequate cover and traveling corridors necessary for them to carry out much of their lifetime requirements.

## **5.1 Research Considerations**

The presence of mink at Study Area 1 warrants additional investigation of the overall Bound Brook Ecosystem. The reach of Bound Brook between Survey Areas 1 and 2, which was not surveyed, could potentially provide suitable habitat for mink. Also, the habitat at Survey Area 4 deserves to be more carefully explored for its potential to support mink. Mink can be expected to range over several miles along a stream or river. Because a viable mink population presumably resides at Bound Brook at or near Survey Area 1, it is not unreasonable to conjecture that mink may occur downstream of Survey Area 1 in the Bound Brook reaches that flow through South Plainfield. Particularly, this may be an appropriate assumption in the case of dispersing juveniles.







**Appendix A**  
**Animal Detections and Potential Animal Occurrences**

**Appendix A.** Bird and mammal species detected at and likely to utilize the Study Area of Bound Brook, South Plainfield, New Jersey.

Species	Survey Area Detected	Type of Sign Detected	Suitable Habitat in Study Area <sup>1</sup>
<u>Birds</u>			
Canada goose <i>Branta canadensis</i>	- <sup>2</sup>	-	Resting habitat on New Market Pond
Wood duck <i>Aix sponsa</i>	-	-	Potential breeding habitat in wooded portions of brook
Green-winged teal <i>Anas crecca</i>	-	-	Potential habitat present throughout
Mallard <i>Anas platyrhynchos</i>	6, downstream of 1	Direct – visual and acoustic	Potential habitat present throughout
Hooded merganser <i>Lophodytes cucullatus</i>	-	-	Potential breeding habitat in wooded portions of brook
Red-tailed hawk <i>Buteo jamaicensis</i>	2	Direct – visual [Adult perched over brook]	Breeding habitat at Survey Area 1
Eastern wild turkey <i>Meleagris gallopavo</i>	1	Indirect – tracks	Breeding and wintering habitat upstream of Survey Area 2
Spotted sandpiper <i>Actitis macularia</i>	-	-	Potential breeding habitat present throughout
Mourning dove <i>Zenaidura macroura</i>	4	Direct – visual and acoustic	Breeding and wintering habitat in fields and shrubs adjacent to brook
Belted kingfisher <i>Ceryle alcyon</i>	-	-	Feeding habitat throughout; breeding habitat possibly in taller, steep banks of brook
Red-bellied woodpecker <i>Melanerpes carolinus</i>	-	-	Breeding and wintering habitat in forest patches
Downy woodpecker <i>Picoides pubescens</i>	1	Direct – visual	Breeding and wintering habitat in forest patches
Hairy woodpecker <i>Picoides villosus</i>	-	-	Breeding and wintering habitat in forest patches
Northern flicker <i>Colaptes auratus</i>	-	-	Breeding and wintering habitat in forest patches
Least flycatcher <i>Empidonax minimus</i>	-	-	Breeding habitat in forest patches
Eastern phoebe <i>Sayornis phoebe</i>	-	-	Breeding habitat throughout
Blue jay <i>Cyanocitta cristata</i>	1, 2, 3, 5	Direct – visual and acoustic	Breeding and wintering habitat throughout
American crow <i>Corvus brachyrhynchos</i>	2, 3	Direct – visual and acoustic	Breeding and wintering habitat throughout
Fish crow <i>Corvus ossifragus</i>	2, 3	Direct – visual and acoustic	Breeding and wintering habitat throughout
Black-capped chickadee <i>Poecile atricapillus</i>	1	Direct – visual and acoustic	Breeding and wintering habitat throughout
Carolina chickadee <i>Poecile carolinensis</i>	1	Direct – visual and acoustic	Breeding and wintering habitat throughout
Tufted titmouse <i>Baeolophus bicolor</i>	-	-	Breeding and wintering habitat throughout
White-breasted nuthatch <i>Sitta carolinensis</i>	-	-	Breeding and wintering habitat in forest patches
Carolina wren <i>Thryothorus ludovicianus</i>	-	-	Breeding habitat in forest patches
American robin <i>Turdus migratorius</i>	1, 2, 3, 4, 5	Direct – visual and acoustic	Breeding and wintering habitat throughout
Gray catbird <i>Dumetella carolinensis</i>	-	-	Breeding habitat in shrub patches



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Species	Survey Area Detected	Type of Sign Detected	Suitable Habitat in Study Area <sup>1</sup>
Northern mockingbird <i>Mimus polyglottos</i>	-	-	Breeding habitat in shrub patches
Brown thrasher <i>Toxostoma rufum</i>	-	-	Breeding habitat in shrub patches
European starling <i>Sturnus vulgaris</i>	2, 3		Breeding and wintering habitat throughout
Warbling vireo <i>Vireo gilvus</i>	-	-	Breeding habitat on the edges of forest patches
Northern cardinal <i>Cardinalis cardinalis</i>	1		Breeding and wintering habitat in shrub patches
Song sparrow <i>Melospiza melodia</i>	4	Direct – visual	Breeding and wintering habitat in shrub patches in openings
Red-winged blackbird <i>Agelaius phoeniceus</i>	-	-	Breeding habitat in tall marshy vegetation on or near brook
Common grackle <i>Quiscalus quiscula</i>	-	-	Breeding and wintering habitat in scrub-shrub wetlands near brook
Orchard oriole <i>Icterus spurius</i>	Survey Area 2	Indirect – Old oriole nest	Breeding habitat in forested patches
Baltimore oriole <i>Icterus galbula</i>	Survey Area 2	Indirect – Old oriole nest	Breeding habitat in forested patches
<b><u>Mammals</u></b>			
Opossum <i>Didelphis marsupialis</i>	-	-	Habitat throughout
Masked shrew <i>Sorex cinereus</i>	-	-	Habitat upstream of Survey Area 2
Water shrew <i>Sorex palustris</i>	-	-	Habitat upstream of Survey Area 2
Short-tailed shrew <i>Blarina brevicauda</i>	-	-	Habitat in grassy areas of Survey Area 4
Star-nosed mole <i>Condylura cristata</i>	-	-	Habitat upstream of Survey Area 2 and at Survey Area 4
Little brown myotis <i>Myotis lucifugus</i>	-	-	Foraging habitat throughout
Northern myotis <i>Myotis septentrionalis</i>	-	-	Foraging and roosting habitat upstream of Survey Area 2
Tri-colored bat (= eastern pipistrelle) <i>Perimyotis subflavus</i>	-	-	Foraging habitat throughout
Big brown bat <i>Eptesicus fuscus</i>	-	-	Foraging habitat throughout
Eastern chipmunk <i>Tamias striatus</i>	1, 2, 3	Direct – acoustic Indirect - tracks	Habitat throughout
Gray squirrel <i>Sciurus carolinensis</i>	1, 2, 3	Direct – visual Indirect – tracks	Habitat throughout
Beaver <i>Castor canadensis</i>	1	Indirect – gnawed and cut trees	Habitat upstream of Survey Area 2
White-footed mouse <i>Peromyscus leucopus</i>	1, 2, 3, 4	Indirect – tracks	Habitat throughout
Meadow vole <i>Microtus pennsylvanicus</i>	1	Indirect – burrows	Habitat upstream of Survey Area 2
Muskrat <i>Ondatra zibethicus</i>	4	Indirect – tracks	Habitat upstream of Survey Area 2 and at Survey Area 4
Black rat <i>Rattus rattus</i>	-	-	Habitat throughout
House mouse <i>Mus musculus</i>	-	-	Habitat throughout
Red fox <i>Vulpes vulpes</i>	-	-	Habitat upstream of Survey Area 2

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Species	Survey Area Detected	Type of Sign Detected	Suitable Habitat in Study Area <sup>1</sup>
Raccoon <i>Procyon lotor</i>	1, 2, 3, 4, 5	Indirect – tracks	Habitat throughout
Long-tailed weasel <i>Mustela frenata</i>	-	-	Habitat upstream of Survey Area 2
Mink <i>Mustela vison</i>	1	Indirect – tracks	Habitat upstream of Survey Area 2
Striped skunk <i>Mephitis mephitis</i>	1, 2, 3	Indirect – tracks	Habitat throughout
Fisher <i>(Martes pennanti)</i>	2	Indirect – tracks and scat	Marginal habitat is present upstream of Survey Area 2 <sup>3</sup>
White-tailed deer <i>Odocoileus virginianus</i>	1, 2, 3, 4	Direct – visual Indirect – tracks	Habitat throughout

<sup>1</sup> Study area refers to the segment of Bound Brook that includes all sampling areas. The Study Area includes the immediate riparian zone.

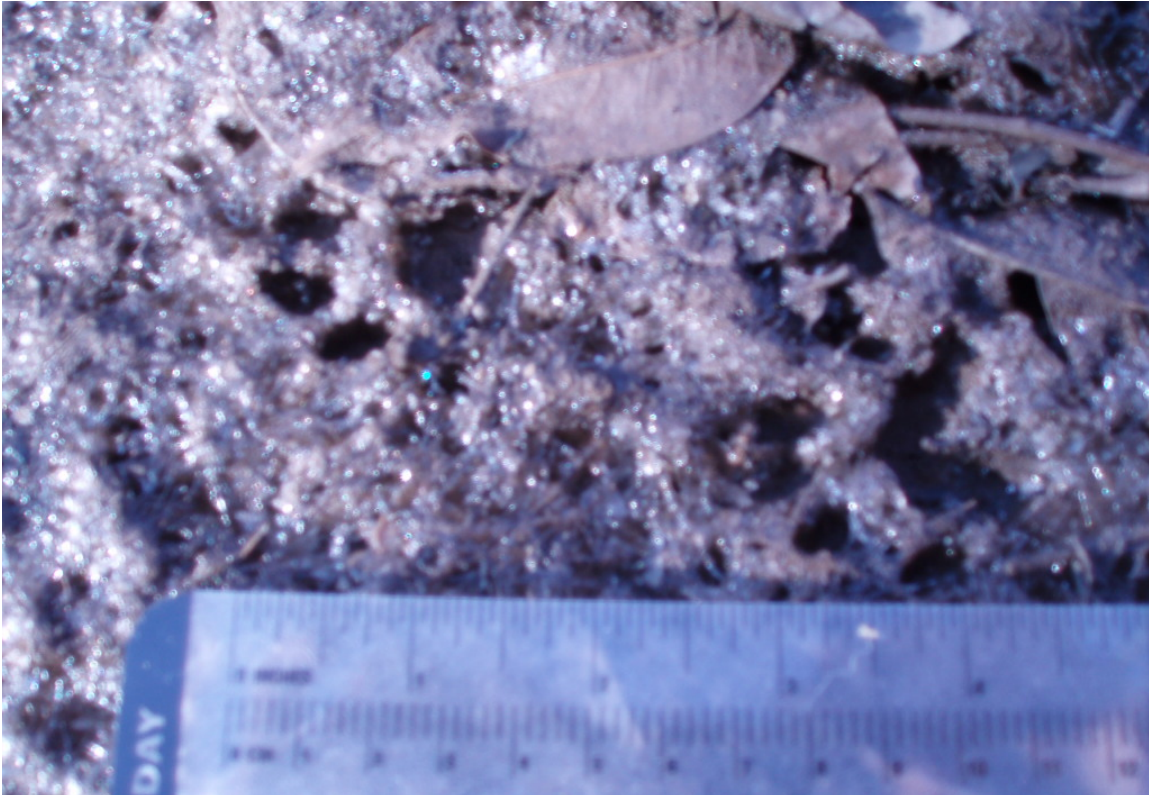
<sup>2</sup> A dash (-) indicates species was not detected during the wildlife survey.

<sup>3</sup> Although fisher signs were detected during the wildlife survey, this was considered to be a rare occurrence of a transient individual.



## **Appendix B**

### **Representative Study Area Photographs**



**Photo 1.** Mink (*Mustela vison*) tracks were detected on icy, muddy banks bordering Survey Area 1 of Bound Brook. Survey Area 1 is approximately 1.3 miles upstream from the Hamilton Industrial Park, South Plainfield, New Jersey. (Stantec – December 3, 2008)



**Photo 2.** Striped skunk (*Mephitis mephitis*) tracks (pair of hind feet) were detected on muddy banks at Survey Area 1 of Bound Brook. (Stantec – December 3, 2008)





**Photo 3.** Active burrows belonging to small mammals, such as meadow vole (*Microtus pennsylvanicus*) and white-footed mouse (*Peromyscus leucopus*), were found on the edge of the riparian zone at Survey Area 1. (Stantec – December 3, 2008)

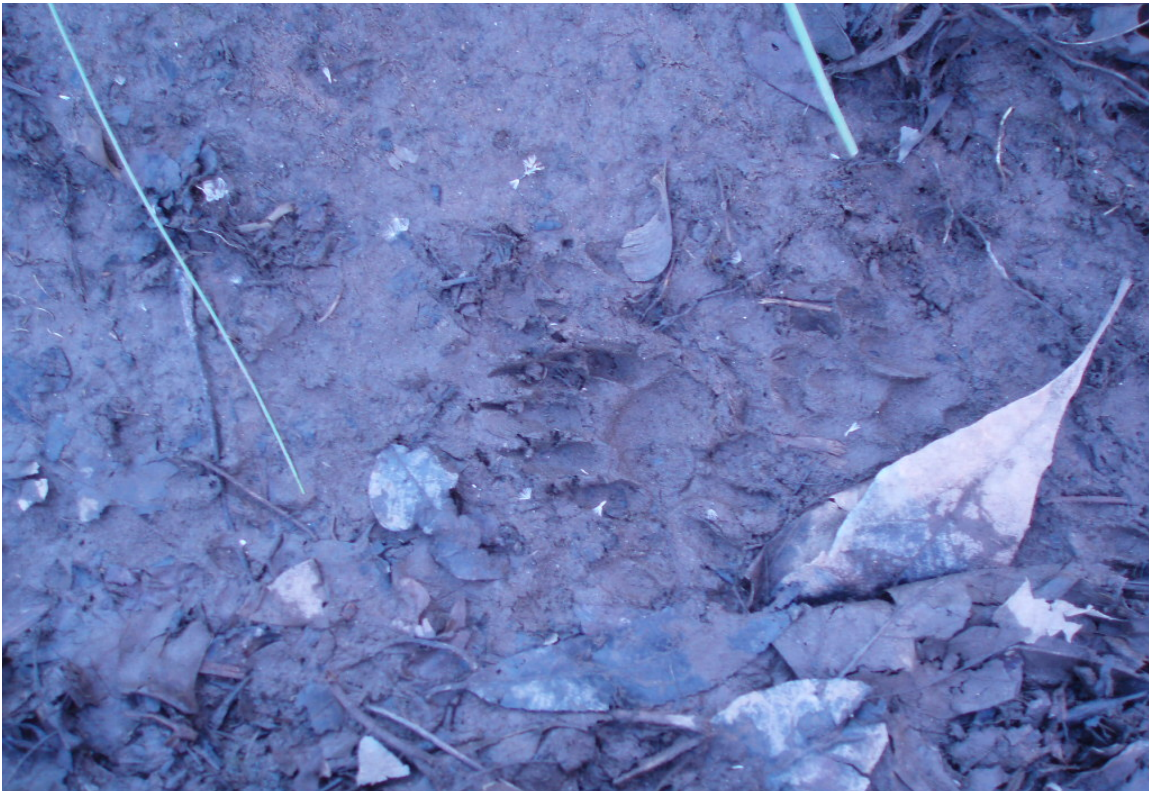


**Photo 4.** Survey Area 2 is immediately upstream of the Hamilton Industrial Park. Bound Brook is bordered by relatively steep banks, but banks are well vegetated. This reach of the brook is a narrow habitat corridor bordered by industrial development. (Stantec – December 3, 2008)





**Photo 5.** Large mustelid tracks were found in one spot on a short, steep, muddy bank at Survey Area 2. Depicted here is a good quality impression of what is suspected to be a fisher (*Martes pennanti*) forepaw. (Stantec – December 3, 2008)



**Photo 6.** The fore and hind tracks of a large mustelid, suspected to be that of a fisher (*Martes pennanti*), are depicted above. These tracks were detected at Survey Area 2. (Stantec – December 3, 2008)





**Photo 7.** A scat pile found at Station 2 exhibits characteristics typical of a large mustelid, such as a fisher (*Martes pennanti*). (Stantec – December 3, 2008)



**Photo 8.** Rodent tracks were found at Survey Areas 1 through 5. Species included mouse (*Peromyscus leucopus*, *Mus musculus*), eastern chipmunk (*Tamias striatus*), vole (*Microtus* spp.), and eastern gray squirrel (*Sciurus carolinensis*). Gray squirrel tracks are depicted here on a small mudflat at Survey Area 2. (Stantec – December 3, 2008)





**Photo 9.** Survey Area 4 is located at the confluence of Cedar Brook and Bound Brook. This reach is located within undeveloped land. (Stantec – December 3, 2008)



**Photo 10.** Survey Area 4 is set in a relatively large tract of open space. The habitat corridor is comprised of woods, scrub-shrub patches, and small, weedy fields. Freight train tracks intersect this habitat patch. (Stantec – December 3, 2008)





**Photo 11.** Muskrat (*Ondatra zibethicus*) tracks were detected on muddy shores of Survey Area 4. At Survey Area 4, Bound Brook is bordered by small fields covered with tall grass. (Stantec – December 3, 2008)



**Photo 12.** Survey Area 5 is a reach of Bound Brook that is characterized by a narrow, wooded corridor bordered by residential development on both sides. (Stantec – December 3, 2008)





**Photo 13.** Raccoon (*Procyon lotor*) tracks were detected at several areas along Bound Brook. Above raccoon tracks were detected along a muddy bank at Survey Area 5. (Stantec – December 3, 2008)